THE RED CUTICLE ON THE CLAW OF MALE *CHERAX QUADRICARINATUS* (DECAPODA: PARASTACIDAE)

The freshwater crayfish *Cherax quadricarinatus* (von Martens) is a member of the Australian family Parastacidae. It occurs in northern Australia from Cape York through the Northern Territory (Riek, 1951).

In recent years, *C. quadricarinatus* has become the major freshwater crustacean cultured in Queensland. Features which make this species ideal for aquaculture include (i) little aggression when held at high densities (ii) good survival at high temperatures (iii) serial spawning.

A striking feature of this crayfish is the soft red cuticle that develops on the outer edge of the propodus in mature males. Growth of the red patch in relation to orbital carapace length is positively allometric. The red patch does not develop in juveniles, and typically occurs in those individuals whose orbital carapace length exceeds 23mm. Intersexes (those crayfish with both male and female genital openings and which comprised 19 in a sample of 456 individuals) develop the red patch. Occasionally, the red patch is developed by females (3 individuals in a sample of 279 females). The possible function of this sexually dimorphic feature is intriguing. A role in defence or attack is unlikely — soft cuticle makes an unsuitable weapon. A role as a visual, sexual signal is also unlikely — the crayfish are mainly active at night, and most crustaceans examined so far are red blind (Shaw and Stowe, 1982). Anecdotal reports indicate that the red patch of the male claws makes contact with the female when the male makes a series of short, sharp jabs at her during courtship.

Major differences between red patch cuticle and ordinary cuticle are: (i) it is soft, flexible and yields easily to touch. The flexibility of red patch cuticle is not achieved in the same way as occurs at hinges between body or leg segments. Hinge cuticle has no continuous lamellae running parallel to the epicuticle. (ii) It is uncalcified (sections through red patch cuticle showed no black colouration when stained using von Kossa's technique for calcium (Culling, 1974) while control sections through chick embryo were positive). (iii) exo- and endocuticle are not differentiated. In ordinary cuticle, epi-, exo- and endocuticle layers are clearly defined. At the transition zone between cuticle types the epicuticle continues without change but the width of the endocuticle decreases. In red patch cuticle no obvious distinction can be made between exocuticle and endocuticle, giving it a two-layered appearance rather than a three-layered one. (iv) the lamellae are narrow. The width of lamellae in red patch cuticle is just over one third the width of lamellae in the endocuticle of ordinary cuticle (12.5µm vs 32.5µm).

Sensilla density on red patch cuticle is similar to that on hard cuticle of the claw. It is also similar to the density on the claws of females in the region where the red patch would occur, if they had one.

Two types of sensilla, simple and plumose, occur on the ordinary cuticle adjacent to the red patch, whereas only simple sensillae appear to occur on the red patch cuticle. Whether the red patch gives the male different sensitivity to tactile or other stimulation from that of the female awaits further investigation.

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M.J. Thorne and D.R. Fielder, Department of Zoology, The University of Queensland, St Lucia, Queensland 4072, Australia.

ULTRASTRUCTURE AND FUNCTION OF THE STOMACH OF PERACARIDA AND EUPHAUSIACEA

Ultrastructurally the stomach is by far the most complicated part of the alimentary canal in Peracarida and Eucarida (for references see Felgenhauer and Abele, 1985; Storch and Strus, 1989). All parts are demonstrated in scanning and transmission electron micrographs. They consist mainly of masticatory parts and filters.

The most complicated region of the stomach is the ventral surface with primary filters, secondary filters, and interolateralia (Storch, 1989; Storch and Strus, 1989; Storch, in prep.; Ullrich *et al.*, in prep.). The mesh sizes of primary and secondary filters vary considerably. Secondary filters of terrestrial Isopoda seem to be the most efficient filters in the animal kingdom. They are good for microfiltration and come very close to ultrafiltration. They are compared to the respective structures in Mysidacea, Tanaidacea, Amphipoda, and Euphausiacea.

Filters of these delicate dimensions have to be constantly cleaned to be kept functional. Spines of the medial face of the interolateralia are probably suitable for this purpose. Additionally, washing occurs when the secretion of the midgut glands move through the same opening as the filtrate but in the opposite direction.

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V. Storch, Department of Zoology, University of Heidelberg, D-6900 Heidelberg, Germany.